EXPLANATION OF PLATES I. & II.

Fig. 1. *Terebratulina? Davidsoni*, R. Etheridge, jun., natural size. Tertiary Coralline Limestone, Mount Gambier, S. Australia. *a*, view of ventral valve; *b*, view of dorsal valve and foramen of ventral valve; *c*, interior of dorsal valve.

Fig. 2. *Waldheimia Garibaldiana*, Davidson, natural size. Tertiary Coralline Limestone, Mount Gambier, S. A. *a*, ventral valve; *b*, dorsal valve and foramen of ventral valve.

Fig. 3. *W. Taylori*, R. Etheridge, jun., natural size. Tertiary Coralline Limestone of the Murray-River Cliffs, S. A. *a*, ventral valve; *b*, dorsal valve, with the groove indicating the position of the septum, and the foramen of the ventral valve; *c*, lateral view of both valves.

Fig. 4. *W. gambierensis*, R. Etheridge, jun., natural size. Tertiary Coralline Limestone of Mount Gambier, S. A. *a*, view of ventral valve; *b*, dorsal valve and foramen of ventral valve; *c*, lateral view of both valves; *d*, view of sinuate front margin. (The figure 4 *a* is partially restored on the left-hand side, the shelly matter being there broken away.)

Fig. 5. *Terebratella compta*, G. B. Sowerby. Tertiary Coralline Limestone of Mount Gambier, S. A. *a*, view of ventral valve; *b*, view of dorsal valve and foramen of ventral valve, both enlarged one and a half times; *c*, interior of ventral valve; *d*, interior of dorsal valve, showing the dilated portion of the mesial septum: the two latter figures are of the natural size.

Figs. 3 *a*, *b*, *c* are from drawings kindly made for me by the late Mr. C. R. Bone, of the Museum of Practical Geology, shortly before his death; for the remainder I am indebted to the artistic skill of my friend Mr. B. N. Peach (of the Geological Survey of Scotland).

III.—*Critical Notes on the New-Zealand Hydroida, Suborder Thecaphora.*

By Millen Coughtrey, M.B., C.M. Edinb. Univ., Hon. Fellow Historic Soc. Lanc. & Ches., President of the Dunedin Naturalists Field-Club, N.Z., &c. &c.

[Plate III.]

To the last volume (no. vii.) of the 'Transactions of the New-Zealand Institute I contributed a paper on the New-Zealand Hydroida*, in which I gave the results of an examination of the type specimens of Capt. F. W. Hutton's paper on the New-Zealand Sertularians†, and of several new specimens I obtained on the New-Zealand coasts. Contrary to my usual practice, and with many misgivings on my part, these notes were rather prematurely published; and I regret now that I did not hold them back until I had more works of

* Vol. vii. pp. 281–293, plate xx.

† Trans. N.Z. Inst. vol. v. 1872.

reference at my command, and a greater supply of specimens from other parts of the world with which to compare the New-Zealand ones.

Workers residing in "an out-of-the-way" part of the earth labour under many disadvantages when contrasted with the facilities afforded to home students. It is true they have got almost a virgin soil; but unless they are to become mere collectors for home cabinet students, they require for almost every branch of science a very great profusion of works of reference. Many of the drawbacks they at present suffer from are probably capable of removal by the aid of patience and an improved intercommunication with the parent country; but other difficulties would lessen were the societies at home unanimously to agree to centralize their publications, remitting zoological papers to purely zoological societies, and botanical to purely botanical. At the present time we find in the department of Hydrozoa, *e. g.*, one paper among the proceedings of a botanical society, another within the covers of a medical review, a third in one of the microscopical journals, others in the various transactions of local societies, and, lastly, as custom has long established, in the present Journal. This decentralization not only proves very expensive to the student, but often involves a large amount of unnecessary labour, though the latter has certainly been much lightened by that inestimable boon, 'The Record of Zoological Literature.' Still a difficulty remains; and that difficulty may be best expressed by an example: take that valuable publication, the 'Transactions of the Royal Society of Edinburgh;' let persons search through the chief provincial towns of Great Britain, and see in how very few the above publication may be found, and they will then understand the scarcity that may exist in a place like New Zealand. On account of the limited means at my disposal, I therefore desire that these remarks may be considered as purely provisional, since I do not possess by me all the works I desire to make them complete.

The classification I have adopted is that used by Mr. Hincks in his 'British Hydroid Zoophytes;' and the order will therefore be found different from that adopted in my previous paper to the New-Zealand Institute. Since those notes were written, I have been able in some cases to verify, in others to correct my former observations, and I have had the means of comparing the New-Zealand specimens with the British species*.

Regarding the Athecate Hydroids and the general history and reproduction of Hydroida here, I prefer to hold back my

* I have to thank my friend Mr. T. J. Moore, of the Free Public Museum, Liverpool, for a packet of these.

notes for further observations, though the New-Zealand fauna presents many peculiarities in this respect. Indeed to-day (September 24, 1875) I discovered a pretty freshwater *Hydra*, in some pond-water, attached to one of the leaves of the plant *Natella ucra*. This *Hydra* in general form is like *H. viridis*, Linn., in colour pale brown, and has seven tentacula, which are peculiar in this respect, that they are distinctly annulated and each ring is fringed.

Suborder Thecaphora, Hincks.

Family **Campanulariidæ**.

Genus Obelia.

Obelia geniculata, Linnæus; Hincks, *loc. cit.* p. 149. (*Vide* Coughtrey, Trans. N.Z. Inst. vol. vii. p. 290, pl. xx. fig. 42.)

This widely distributed species is present in New Zealand. It differs from the British specimens in the following particulars: it is more robust in habit, its hydrothecæ are larger, and its gonothecæ present some peculiarities. In many specimens these are decidedly urceolate, as figured by me; but occasionally on the same colony there may be observed one or two reproductive capsules that have a similar form to the nutritive calycles, only that they are quite as large as the other gonothecæ.

The habitat of this species will enable me to present one or two points of interest in connexion with those masses of floating seaweed in which Prof. Agardh, of Lund, has exhibited an interest. There grows most luxuriantly in the southern harbours of the New-Zealand and Australian coasts, within and a little below ordinary tidal limits, a fucus which seems to me to be "*Macrocystis pyrifera*" of Decaisne. Wherever I have found fronds of this seaweed in the neighbourhood of land, I have got *O. geniculata* upon it. And I have found it in the following localities:—east and south coasts of Middle Island, New Zealand; King George's Sound and Glenelg, Australia; also in Port-Philip Harbour and Bass Strait (loose and floating).

When *O. geniculata* attaches itself to a virgin frond, it spreads in a peculiar manner: there is one parent or primary shoot, which runs generally obliquely across the frond; and this gives off from one side several shoots, which run in the long direction of the frond quite parallel to one another, and but rarely communicating with one another by lateral shoots. From the longitudinal stoloniferous shoots there are sent up at regular

intervals the stems of each subcolony; but those nearest the parent stolon are most abundant in calycles.

The same fucus (*M. pyrifera*) on which *O. geniculata* is so frequently found forms the chief part of those islands of seaweed so abundant in the Southern Ocean between latitudes 45° and 50°, especially in the vicinity of the Crozet Isles and of Kerguelen's Land; and it has been my good fortune during two separate voyages to secure by appropriate tackle detached masses of this seaweed. I have examined them on all occasions with great care, and have been surprised to find a total absence of animal life; while other specimens of this seaweed, bearing every appearance of having been floating on the surface for days, and that had been washed ashore, had numerous clusters of Hydroida, Polyzoans, and Cirripeds in great profusion.

Obelia pygmæa (?), sp. nov. provisionally referred to this genus. Pl. III. fig. 3.

Shoots very profuse where the sponge-patches are on stems of *Boltenia pedunculata*, Milne-Edwards. It arises from a creeping filamentous hydrorhiza, grows to the height of $\frac{3}{4}$ of an inch, extremely delicate and transparent. Hydrocaulus branched; branches ringed just above their origin; hydrocaulus strongly ringed beyond where branches arise. Internodes between pedicels of hydrothecæ irregularly ringed (from six to twenty rings). Hydrothecæ broadly campanulate, rim entire, alternate; extremity of each branchlet divided into two hydrothecæ; pedicels annulated (ten to fifteen rings).

Gonothecæ ——?

Genus Campanularia.

Campanularia bilabiata, mihi, *loc. cit.* p. 291, pl. xx. figs. 46 & 49.

I have nothing fresh to add to my previous description of this species.

Campanularia integra (?), Hutton, fig. 45 (my paper).

In describing this species, which I figured, I mentioned that it did not agree with *C. integra* of Johnston. Further observation has confirmed this opinion, and I now believe it to be *C. caliculata*, Hincks, and to agree specially with the variety, fig. 2 *b* of plate xxxi. 'British Hydroid Zoophytes.' The annulation of the pedicel is a little too strongly marked in my figure*.

* On the smaller seaweeds just beneath low-water mark, Port Chalmers, I got a small species in general habit and size very like *C. caliculata*.

Family **Haleciidæ.**

Genus HALECIUM, Oken; Hincks, Brit. Hydr. Zooph.

Halecium delicatulum, sp. nov. (Pl. III. figs. 4 & 5),

is the name I propose for a very delicate species of *Halecium*, whose general appearance resembles somewhat a minute specimen of *H. Beanii*.

Hydrophyton slender, 0·5–1·0 inch in height, pale and transparent.

Hydrocaulus pinnately branched, simple in character, slightly tumid where branches are given off. Internodes between the calicular pedicels jointed in lower half just above origin of pedicels; joints from two to three rings. Hydrothecæ alternate, pedicellated; lower ones oldest of three generations of polypites, upper ones sessile; in the oldest, where the calicular tubes fit into one another, there is a small joint.

Gonothecæ ——?

Hab. On sponges, deep water, Dunedin Upper Harbour.

Family **Sertulariidæ.**

Genus SERTULARELLA.

Sertularella Johnstonii, Gray, Dieff. N. Z. vol. ii. p. 294; Hutton, *loc. cit.*; Coughtrey, *loc. cit.*

Mr. Hincks remarks of this species that it makes a near approach to *S. tricuspidata*, British species. I have carefully compared it with the latter, and I agree with Mr. Hincks, its chief points of difference being that the mouths of the hydrothecæ are contracted, rendering the calycles subconical in form, as in *S. polyzonias*. Many of the gonothecæ are very like that figured at p. 240 of 'British Hydr. Zooph.' In habit it attains a greater height than *S. tricuspidata*; and I have deposited a very handsome specimen of *S. Johnstonii*, which shows this, in the Liverpool Free Public Museum.

The hydrothecæ have the inverted hand-bell appearance, but are of the ovato-conic form, the chitine suddenly tapering off near the rim, which is deeply crenulated. The greater part of the pedicel is spiral; but it is peculiarly jointed to the calycles. At base of calycle is a distinct ring of chitine; there are two other rings, which are longer, the proximal one being at least twice the length of the intermediate one, and three times that of the most distal one. I am inclined to place them in the genus *Campanulina* (Van Beneden). *Vide* Pl. III. figs. 1 & 2.

Sertularella subpinnata and *Sertularella delicatula*, Hutton, *loc. cit.*

I still believe these two species to be varieties of *S. Johnstonii*; and I have made fresh examinations of them.

Sertularella simplex, Hutton, *loc. cit.*; Coughtrey, *loc. cit.* p. 283, pl. xx.

In my paper to the New-Zealand Institute I expressed an opinion that *S. simplex* of Hutton was the New-Zealand representative of *S. polyzonias* of Linnæus; and I grouped along with Hutton's species several pygmy varieties in which the hydrothecæ were transversely wrinkled. In this I was wrong; and I would now regard Capt. Hutton's species as a distinct one, approaching nearest to *Sertularella fusiformis* of Hincks; while the transversely wrinkled variety (pl. xx. fig. 9, *loc. cit.*) is an intermediate form between *S. rugosa* and *S. tenella*, British species, but approaching nearest to the latter; and the large one with the denticles (fig. 10, *loc. cit.*), together with the form figured in the present paper, I believe to present other and distinct characters to form a separate species, for which I would propose the name of *Sertularella robusta* (Pl. III. figs. 6 *a*, *b*, *c*).

In habit *S. robusta* resembles *S. geniculata*, Hincks (Ann. & Mag. Nat. Hist. ser. 4, vol. xiii. p. 152), or, again, the specimen of *S. polyzonias* obtained by Sars from the North Cape ('British Zoophytes'). The two most robust specimens I have gathered were both from the southern coasts,—one from the shell of *Imperator imperialis*, got in the Foreaux-Straits oyster-bank; the other from the rootlets of a large Laminarian that had been washed ashore on the Ocean Beach, Dunedin. I think it right to mention that of all the specimens I have gathered belonging to the *S. polyzonias* group, those from the east coast are considerably smaller than those got on the southern coast. This difference in size accords well with what is seen in the same type in the northern hemisphere.

Genus Sertularia, Linnæus (in part), Hincks, Brit. Hydr. Zooph.

Sertularia bispinosa, Hutton, *loc. cit.*, and Coughtrey, *loc. cit.* p. 284, pl. xx. fig. 17.

Dynamene bispinosa, Gray.

Mr. Busk, when reporting on the Sertularian Zoophytes

and Polyzoa from Natal, South Africa*, remarked the resemblance between this species and *S. operculata*, British. The likeness only holds good with one of the varieties of *S. bispinosa* of New Zealand; and that is the extremely delicate and slender variety. The other variety is so very much more robust and coarse than the British specimen, that, independently of the peculiar differences in the form of the gonothecæ, a difference must be said to exist.

Sertularia ramulosa, mihi.

I have lately met with delicate and coarse varieties of this species, and have observed in some specimens that the hydrothecæ are directed chiefly towards the outside of each little fascicle or branch, the gonosomic elements lying only on the inside. I have got this species at the Bluff.

Sertularia trispinosa, mihi, *loc. cit.*

The relation this species bears in habitat and minute characters to the above two species has been preserved in all specimens I have recently gathered.

Sertularia abietinoides, Hutton, *loc. cit.*; Coughtrey, *loc. cit.* p. 285.

Dynamene abietinoides, Gray, Dieffenbach's N. Z. vol. ii.

In general habit the chief variety of this species bears a close resemblance to *S. filicula* (British species); while the characters of the hydrothecæ and of the gonothecæ at once proclaim a vast difference not only from the above species, but also from the more robust British ally *S. abietina*.

Sertularia fusiformis, Hutton, *loc. cit.*; Coughtrey, *loc. cit.* p. 285.

In consequence of there being a likelihood of this species being confused with *Sertularella fusiformis*, Hincks, I would suggest for it the name of *Sertularia longicosta* (from the crest along one side of the gonotheca). Its ovarian capsules approach somewhat the form of those described by Mr. Busk on the South-African variety of *Plumularia cristata* (Brit. Assoc. Report, 1850, p. 120); again, the apex of the capsule

* Brit. Assoc. Report, 1850, p. 118.

has an appearance not unlike the crest of *Camp. calceolifera*, Hincks (Ann. & Mag. Nat. Hist. ser. 4, vol. viii. p. 78). It never attains a greater height than 2 inches.

Sertularia pumila (sp. nov. to N. Z.) = *Synthecium gracilis*, mihi, *loc. cit.* p. 286, pl. xx. figs. 26–31.

I am now perfectly satisfied that I was in error when I placed this species under Allman's genus *Synthecium*. I have carefully compared it with varieties of *S. pumila* from the Mersey (Britain) and elsewhere, and cannot detect sufficient specific characters for a new species.

The differences I observed in the New-Zealand specimens (as shown in *loc. cit.* pl. xx. figs. 26 & 27, both magnified to same extent) are present in British specimens; and one character has been observed by Dr. M'Intosh in St.-Andrews specimens, namely presence or absence of joint in the stem (Ann. & Mag. Nat. Hist. ser. 4, vol. xiii. p. 212).

Sertularia elegans.

Synthecium elegans, Allman (Gymnoblastic Hydroids).

Another small specimen has enabled me to confirm my previous identification of this species. It is equally pygmy in size with my first one, and in one of the calycles has the lower three fourths of the peculiar ovarian capsule described by Prof. Allman. *Vide* Trans. N.Z. Inst. vol. vii. pl. xx. fig. 25*.

Genus Hydrallmania.

Hydrallmania? bicalycula, sp. nov. Pl. III. figs. 8, 8′, 8‴, 9.

I place this specimen provisionally under the above genus; but the generic characters would have to be remodelled to admit it. I do not think it can be the *Sertularia unilateralis*

* *Sertularia* ——? I lately obtained from the Bluff Harbour, just below low-water mark, a little specimen resembling in many points *S. pumila*, but which I am undecided where to place. The shoots spring from a filiform hydrorhiza. Stems straight, very much thicker than pinnæ; pinnately branched, pinnæ subopposite. Pinnæ arise by a peculiar joint from stem, like as in Pl. III. figs. 7, 7′, 7″, & 7‴. Hydrothecæ opposite, crowded, ensheathing the axis, so that scarcely any interspace is observed between those on the pinnæ, while a large interspace is observable between those on the stems; hydrothecæ short and stout, toothed and operculated; a small joint between each pair of hydrothecæ. *Vide* Pl. III. fig. 7.

of Quoy and Gaimard; but I have forwarded by this mail a small specimen to my old teacher Prof. Allman, with the request that he would compare it with the above species.

The zoophyte is large and lax, of a dark brownish colour where it arises from the hydrorhiza, and very strong at that part, becoming lighter in its ultimate branches, so that its pinnæ are quite light and transparent. It attains a height of 12 inches. Stem arises from a filamentous hydrorhiza, is made up of several tubes twisted, all of them bearing calycles, and gives off close to its origin from eight to twenty branches, which bifurcate within an inch of their origin into long, loose, flexuous branchlets, some of these being nearly 7 inches in length. These branchlets are pinnated. Pinnæ arise from margins of one side of rachis (sometimes opposite, sometimes alternately) by a thin, narrow, twisted pedicle; length of pinnæ 0·1–0·5 of an inch, most commonly 0·25 of an inch.

Hydrothecæ on stem, branches, branchlets, and pinnæ, unilateral and opposite, in pairs, and springing from a thickened portion of rachis. Adjacent surfaces of the hydrothecæ of one pair are quite close to one another. Hydrothecæ most crowded on pinnæ, less so on branches, least so on parent stem, where they are distant, and the pairs are occasionally separated by an oblique irregular joint. Calycles large, distal end bent and free. Mouth rounded, lateral parts of lips sinuous.

Gonothecæ abundant on pinnæ, large, length 0·13 inch, width 0·08 inch; urceolate, with a small mouth, which is round, entire, and supported on a short simple neck. At the widest part of the capsule, at a distance of one fourth of its (capsule's) entire length from the mouth, there is a faint rim. Capsule subpedicellated.

Hab. On shells and stones, 1 to 2 fathoms, Bluff Harbour; also Wickliff Bay, Otago peninsula.

Sertularia monilifera, Hutton; Coughtrey, *loc. cit.* p. 282.

I am very doubtful of the generic relations of this species; and I am now inclined to regard it as allied to the genus *Diphasia*.

Genus Thuiaria.

Thuiaria subarticulata, mihi, *loc. cit.* p. 287, pl. xx. figs. 32 & 33.

I have lately had several opportunities of examining this species, and of comparing it with many specimens of the British species *T. articulata*; and I am satisfied the two are distinct.

The British species is much the finer and slenderer of the two; the pinnæ are longer, the hydrothecæ more evenly tubular and free from dentations, while the absence of transverse wrinkles over the whole of the ovarian capsules is marked, though I have gathered British specimens in which the proximal three fourths of these capsules was strongly and deeply wrinkled.

I notice that the southern specimens bear the same relation to the east-coast ones as Mr. Norman's Shetland variety does to the ordinary British species.

Family **Plumulariidæ**, Hincks, Brit. Hydr. Zooph.

I intend to be very brief regarding the specimens under this head at present, and only to give workers a few items of importance about them, until I have the opportunity of making more observations.

Genus Antennularia.

Antennularia antennina of New Zealand is identical with the British species.

Genus Aglaophenia.

Aglaophenia pennatula.

I have recently got several fresh specimens of this, and I am satisfied it is different from *A. pennatula* (Hincks). In my sketch fig. 37, pl. xx. *loc. cit.*, the calycles are not as tubular as in nature.

Aglaophenia Huttoni and *A. incisa*, mihi, *loc. cit.* pp. 289, 290.

I have not yet obtained fresh specimens of these.

Plumularia simplex, mihi, ought to be discarded and placed among the Sertulariidæ. I was misled in my first specimen by distorted appearances; but fresh specimens proved to me that I had been wrong. I think it fair to acknowledge mistakes as freely and as early as possible. I will place this species in its proper position in a future paper.

In conclusion, allow me to state that I should be obliged if authors in this department would exchange with me their papers for specimens.

EXPLANATION OF PLATE III.

[All objects that are magnified are to 80 diameters.]

Fig. 1. Distal half of pedicel and a calycle of a Campanularian allied to *C. caliculata* (Hincks).

Fig. 2. The same (to show natural size and habit), growing from part of the stem of a *Boltenia* (p. 25, note).

Fig. 3. *Obelia pygmæa* ?, portion of stem and one branch (p. 25).

Fig. 4. *Halecium delicatulum*, older part of hydrophyton.

Fig. 5. The same, to show younger part of hydrophyton.

Fig. 6 *a*. *Sertularella robusta*, southern species, ×80 diam. *b*. A specimen from east coast, to show difference in size of calycles, ×80 diam. *c*. *S. simplex*, intermediate between *S. rugosa* and *S. tenella* (*vide* p. 27), ×80 diams.

Fig. 7. *Sertularia* —— ?, from the Bluff, New Zealand. 7′. Portion of pinnæ, magnified. 7″. Part of stem, magnified.

Fig. 8. *Hydrallmania* (?) *bicalycula*, from the Bluff, New Zealand. 8′. Shows a branchlet, mode of origin of pinnæ, the relative distance of the calicular pairs on pinnæ and stem respectively, also the attachment of gonothecal pedicel. 8‴. A gonothecal capsule.

Fig. 9. Exhibits a profile view of a branchlet of *H. bicalycula*, showing the unilateral position of the hydrothecæ.

IV.—*Description of a supposed new* Suthora *from the Dafla Hills, and a* Minla *from the Nágá Hills, with Remarks on* Pictorhis (Chrysomma) altirostre, *Jerdon*.

By Major H. H. Godwin-Austen, F.R.G.S., F.Z.S., &c., Deputy Superintendent, Topographical Survey of India.

I have to publish another interesting bird from the Dafla hills, Assam, of the genus *Suthora*, closely allied to *S. munipurensis*, Wald. & G.-Aust., described in the 'Ibis' for 1875, p. 250. The difference between them is most marked on the underside, the chin being grey in the Dafla bird, paling on the upper breast and belly to dull yellowish white; while in the Munipúr and Nágá species the chin and throat are deep black, fading to grey on the breast, into the white of the lower tail-coverts. There is also a marked difference in size, this new form being the smallest of the genus now known.

Suthora daflaensis, n. sp.

Above—crown of head chrome-brown, back and rump rusty olivaceous brown; tail very rich rusty brown, particularly near the base; frontal band, passing over the eye to the nape, black; a white circle round eye, with a moustachial streak passing